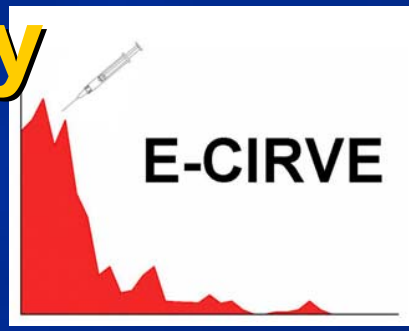
Exploratory Center for Interdisciplinary Research in Vaccinology at Emory



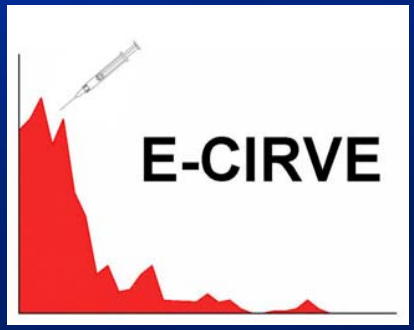
David S. Stephens MD

Professor of Medicine and Microbiology and Immunology

NIH Interdisciplinary Research Centers Workshop Meeting, February 9-10, 2006

Exploratory Center for Interdisciplinary Research in Vaccinology at Emory (E-CIRVE)

- Scientific Rationale and Problem
- E-CIRVE Goals and Aims
- Integrating Interdisciplinary Sciences and Vaccine Research at Emory
- Institutional Commitment
- Strategies for Management, Communication and Evaluation
- Selected Accomplishments



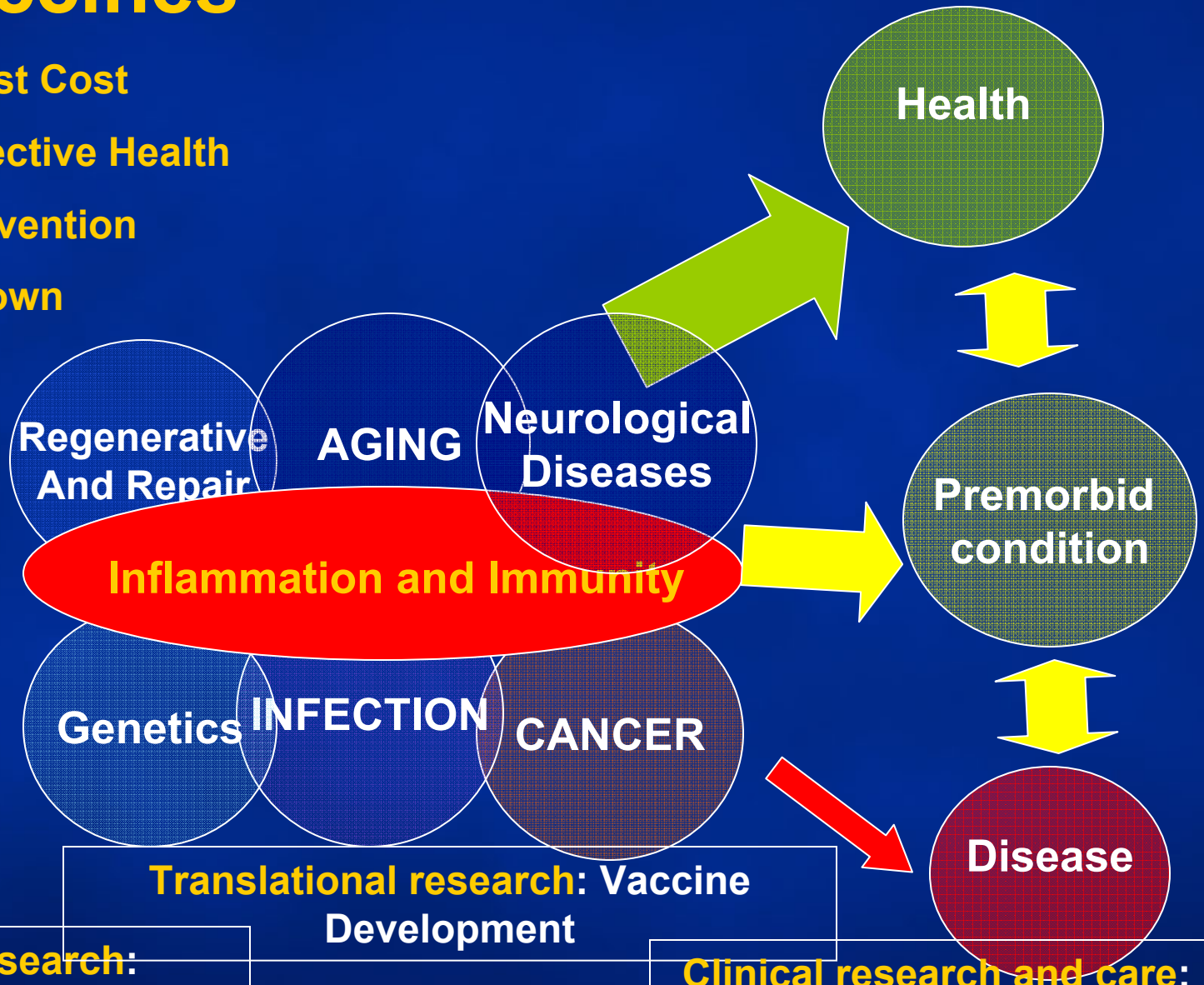
Vaccines*

*Most Cost

Effective Health

Prevention

Known



Translational research: Vaccine Development

Basic research: Pathogenesis Vaccine Discovery

Clinical research and care: Vaccine Delivery, Policy and Use

Vaccines: Obstacles

- Incomplete understanding of human immune correlates of protection
- Delays in identification of candidate antigens
- Limited understanding of risk factors for vaccine failure or adverse events
- Difficulty in eliciting adequate immune responses in the very young, the very old and the immunocompromised
- Imperfect delineation of the best strategies for the design of infectious and non-infectious disease vaccines
- Problems with vaccine use, acceptance and supply.

Addressing these obstacles requires an interdisciplinary approach

Strength of Immunology and Vaccine Research at Emory and in Atlanta

Ongoing Research: T- and B- cell human immunology, innate immunity, immune senescence, transplantation immunology, immunity to infectious agents, basic and clinical vaccinology, novel antigen delivery technology, immune systems biology, bioinformatics/quantitative immune responses, population-based studies.

Research Programs: University and School of Medicine ranked in top 20, Rollins School of Public Health ranked in top 10 programs, Woodruff School of Nursing and Yerkes Primate Center.

Partnerships: Centers for Disease Control and Prevention, American Cancer Society, Carter Center, Georgia Research Alliance, Georgia Department of Human Resources, Georgia Institute of Technology, The Task Force for Child Survival and Development.

Emory Vaccine Center

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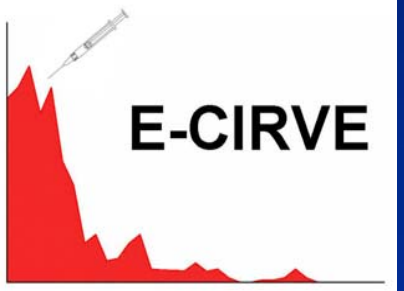
Where Science Meets Hope.

- **E-CIRVE**
- Emory Program for Vaccine Development, Policy and Education
- Emory Program for Vaccine Science
- Hope Clinic: Vaccine Clinical Trials
- Pediatric Vaccine Research Center
- Emory Center for Global Vaccines
- HIV/AIDS Vaccine Development Programs – NIH
- Biodefense Vaccine and Immunology Programs - NIH

Interdisciplinary Sciences at Emory

- Infectious Diseases
- Human Genetics
- Vascular Biology and Free Radical Biology
- Aging
- Neurosciences
- Cancer
- Behavioral Science, Health Policy, Ethics, Communications, Economics
- Global Health
- Imaging
- Biomedical Engineering



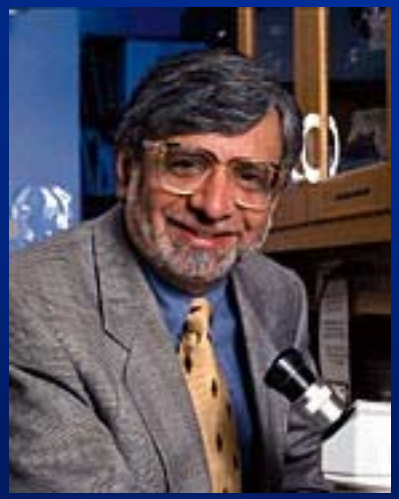
E-CIRVE Planning Goals

- Create a multidisciplinary scientific working council of key scientific leaders and center directors to develop novel strategies for problem-solving in vaccinology.
- Explore how to integrate new quantitative methodologies (genomics, proteomics, systems biology, other computational methodologies) for assessing vaccine immune responses and reactogenicity, developing better dynamic methods for modeling of vaccine use, and planning integrative models for economic assessment of vaccines.
- **INFLUENZA VACCINE MODEL**
  - Explore the design and limitations of quantitative methodologies to define molecular signatures of adaptive and innate immune responses to influenza vaccines.
  - Design novel approaches to influenza vaccine policy.

E-CIRVE Steering Committee

Dr David Stephens, MD

Dr Walter Orenstein, MD



Dr Rafi Ahmed, PhD

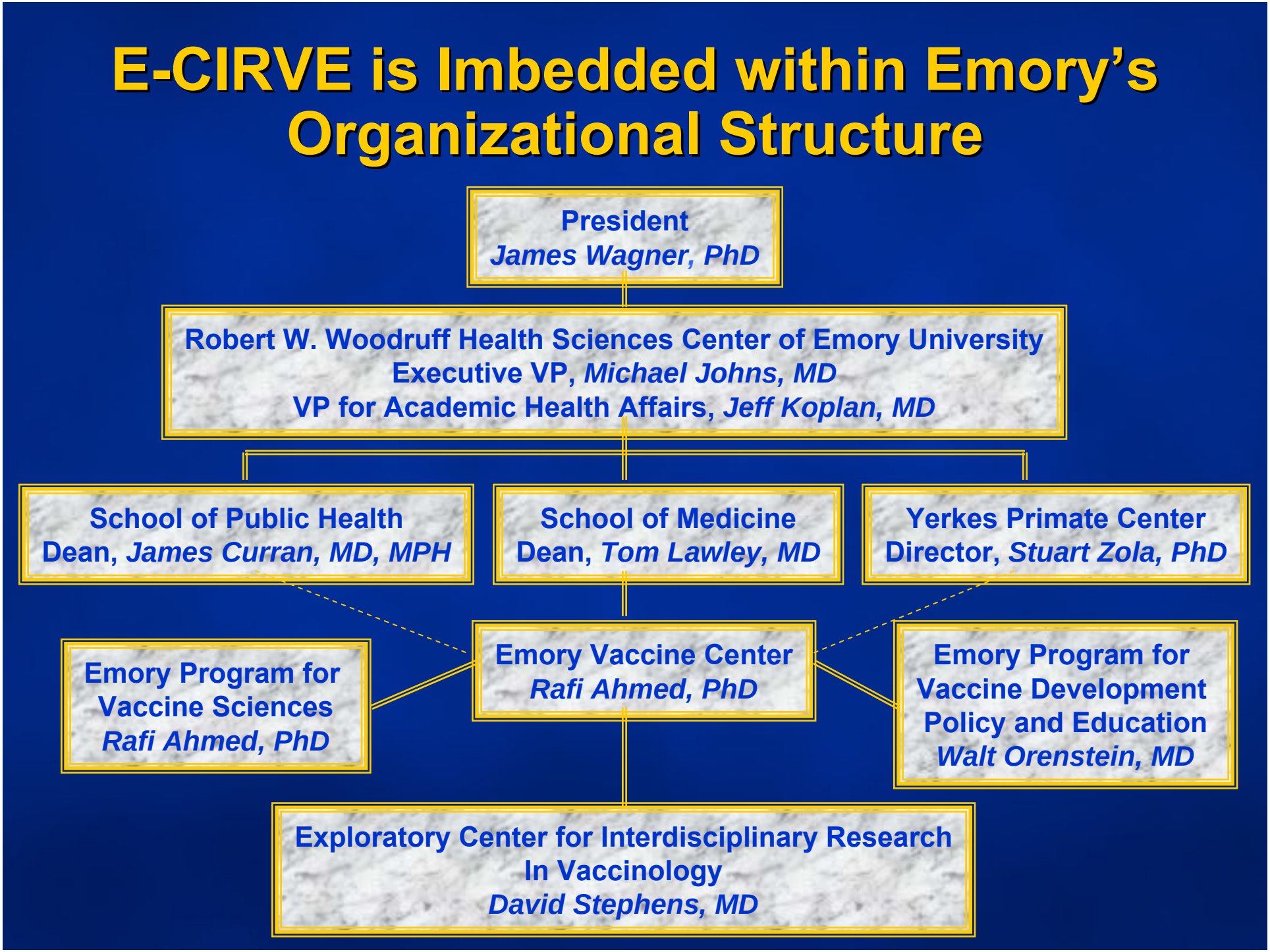
Dr Elizabeth Halloran, MD PhD DSc

Interdisciplinary Scientific Council

Medicine/Translational Research/Vaccine Trials and Development, Microbial Pathogenesis, ID	David S. Stephens MD MEDICINE (ID)
Vaccine Science and Microbiology and Immunology, Emory Vaccine Center	Rafi Ahmed PhD MICROBIOLOGY and IMMUNOLOGY
Human Immunology, Autoimmune Rheumatic Diseases	Jorg Goronzy MD, PhD MEDICINE (Rheumatology)
Modeling, Biostatistics, Analytical Epidemiology	Elizabeth Halloran MD, MPH, DSc BIOSTATISTICS
Vaccine Ethics, Policy and Supply, Pediatrics	Walter Orenstein MD, Jeffery Koplan MD, Alan Hinman MD PEDIATRICS and PUBLIC HEALTH
Behavioral Sciences	Claire Sterk PhD BEHAVORIAL SCIENCES
Engineering, Computer Science and Informatics	Larry McIntire PhD, ENGINEERING
Human Genetics	Steve Warren PhD GENETICS
Health Economics, Health Policy, Management	Kenneth Thorpe PhD ECONOMICS
Population Biology, Pathogen Emergence/Evaluation	Rustom Antia PhD BIOLOGY

E-CIRVE's Management Structure

E-CIRVE is Imbedded within Emory's Organizational Structure



Institutional Commitment

- Emory has longstanding commitment to excellence in multidisciplinary research, collegial environment
- The Woodruff Health Science Center integrates all the health divisions and associated University disciplines:
  - Schools of Medicine, Public Health and Nursing
  - Emory University Hospital
  - Crawford Long Hospital of Emory
  - Yerkes Regional Primate Research Center
  - Wesley Woods Geriatric Center
  - Three Affiliated Healthcare Systems
- Establishment of the Emory Vaccine Research Center, a 76,000 sq. ft. building with 23 state-of-the-art laboratories, underscores Emory's commitment to world leadership in vaccine research.

Institutional Commitment

- Team Science Recognition:
  - President's new university strategic initiatives: Global Health, Neurosciences, Computational & Life Sciences and Predictive Health
  - Promotions and Tenure
  - Recruitment of new interdisciplinary faculty

    Kevin Ault, MD: Obstetrics/Gynecology, Human Papillomavirus vaccine

    Edward Mocarski, PhD: Microbiology/Immunology, cytomegalovirus vaccine
  - Building of new laboratory facilities
  - The Woodruff Health Sciences Center and Emory SOM actively promote interdisciplinary sciences
  - Positive Influence on E-CIRVE activities.

Communications Strategies

- Steering Committee
- Multidisciplinary Scientific Council
- Workshops
- Teams/Small Group Meetings
- Steering committee visits to investigator's site of research
- Vaccine Dinner Club
  - 10 meetings/yr, first Wednesday of each month of the academic year
  - Over 1,300 members from Emory, CDC, UGA, Georgia State, Georgia Tech, the Carter Center, Morehouse University, Mercer University, the State of Georgia government

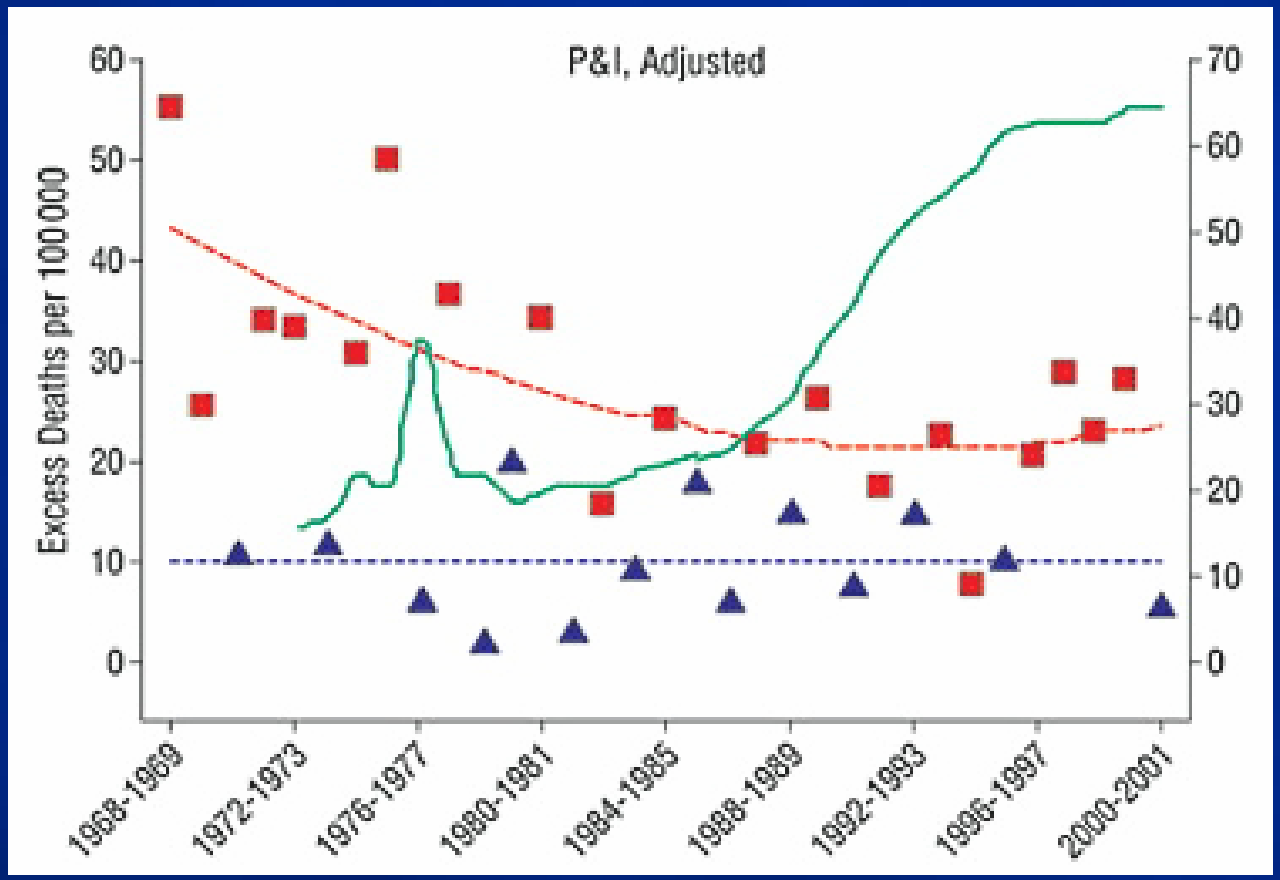
Evaluation Methods

- Project focused: Develop New Collaborations and Interdisciplinary Projects
- Use of Milestones to Monitor Progress
- Development of Products: Publications, Conferences, Grants
- Steering Committee, Scientific Council Oversight

Lessons

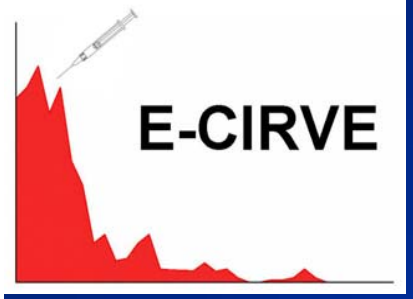
- **Time commitments** of key scientists must be accommodated in novel ways.
- **Individual or small group meetings** complemented by frequent information exchange between council members can reduce the number of formal meetings needed.
- **Steering Committee site visits and presentations** to potential investigators have been invaluable in building new collaborations.
- **Collaborative research projects** can be designed so that a single study or survey instrument can satisfy the needs of investigators from multiple departments.

Seasonal excess pneumonia and influenza (P&I) ≥ 65 yrs, from 1968 through 2001



From Simonsen L, et al.
Arch Intern Med
2005:165:265-272

Figure 3. Green line shows influenza vaccination coverage. Adjusting for age and controlling for dominant influenza virus subtypes modified the excess P&I and all-cause mortalities rates; here, red squares indicate mortality rates for individual seasons dominated by influenza A (H3N2) viruses. Seasons dominated by influenza A (H1N1) and/or B viruses are shown as triangles.



Conferences

June 17, 2005

Vaccines: Not Enough or Not Enough Time?

October 24-25, 2005

Universal Vaccination Against Influenza: Are We Ready?

November 10, 2005

Pandemic Influenza Planning: The Reality of Implementation in the Southeast

Immunologic Markers for Developing Vaccines

Can new immunological markers of a robust immune response be identified for use in developing better vaccines for problem populations?

Influenza vaccine in transplant recipients

Translational research integrating cutting edge immunology and human vaccine studies

Key Collaborators

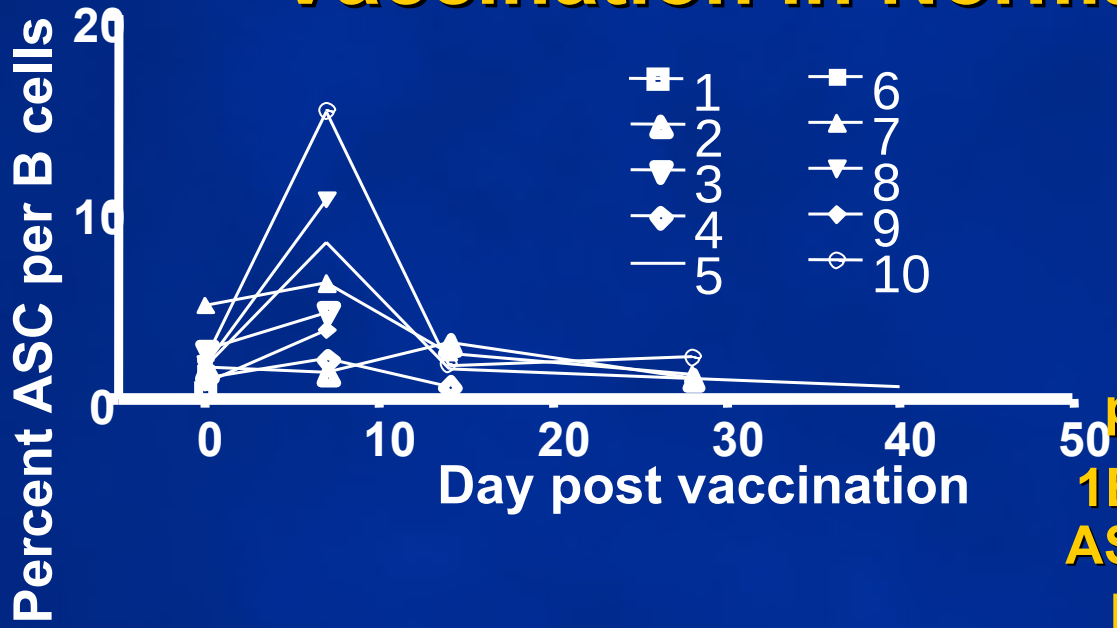
—Rafi Ahmed: Immunology, Vaccine Science

—Jens Wrammert: Immunology, Vaccine Science

—Christian Larsen: Surgery, Transplantation Biology

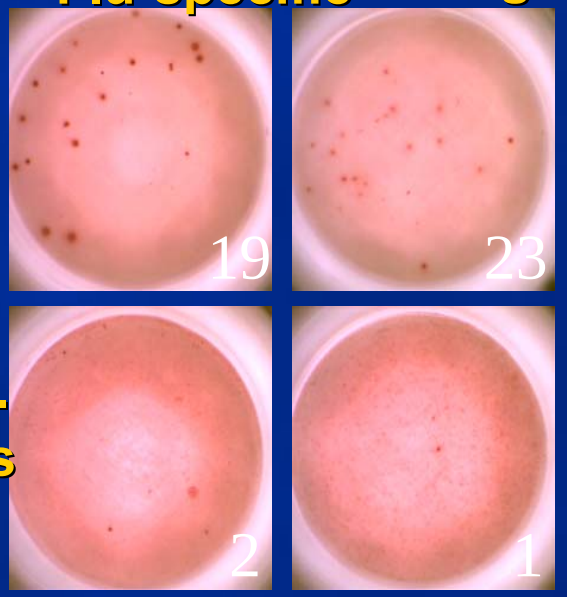
—Computing and Informatics

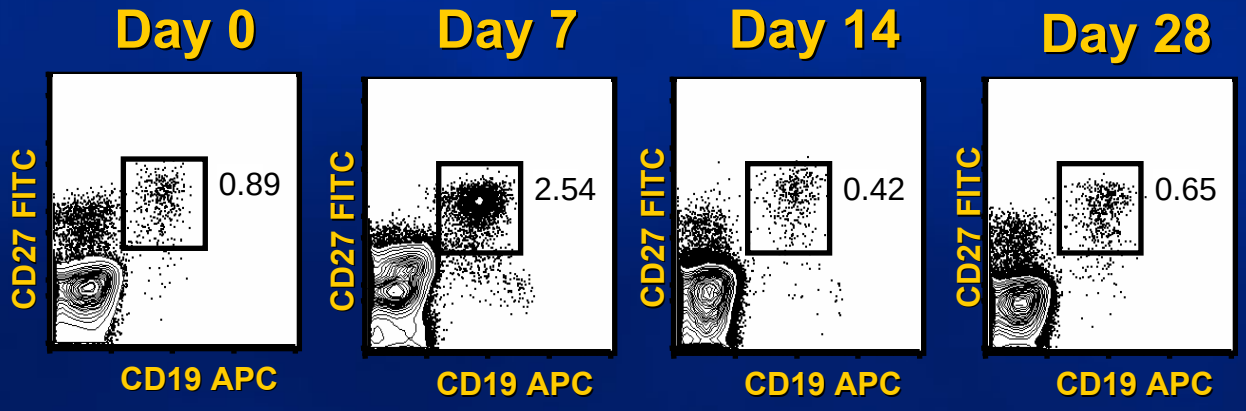
Kinetics of Influenza Specific Antibody Secreting Cells after Influenza Booster Vaccination in Normal Patients



50 ASC cells plated

1E6 non-ASC cells plated





New Collaborations: Reducing Community Burden of Influenza through New Vaccination Strategies

Integrates efforts of vaccine policy makers, behavioral scientists, epidemiologists, communications specialists, infectious disease experts, clinicians, economists, and immunization program managers

Key Collaborators

—Walter Orenstein: Vaccine Policy, Epidemiology

—Julie Gazmararian: Behavioral Science/Health Education

—Paul Weiss: Biostatistics

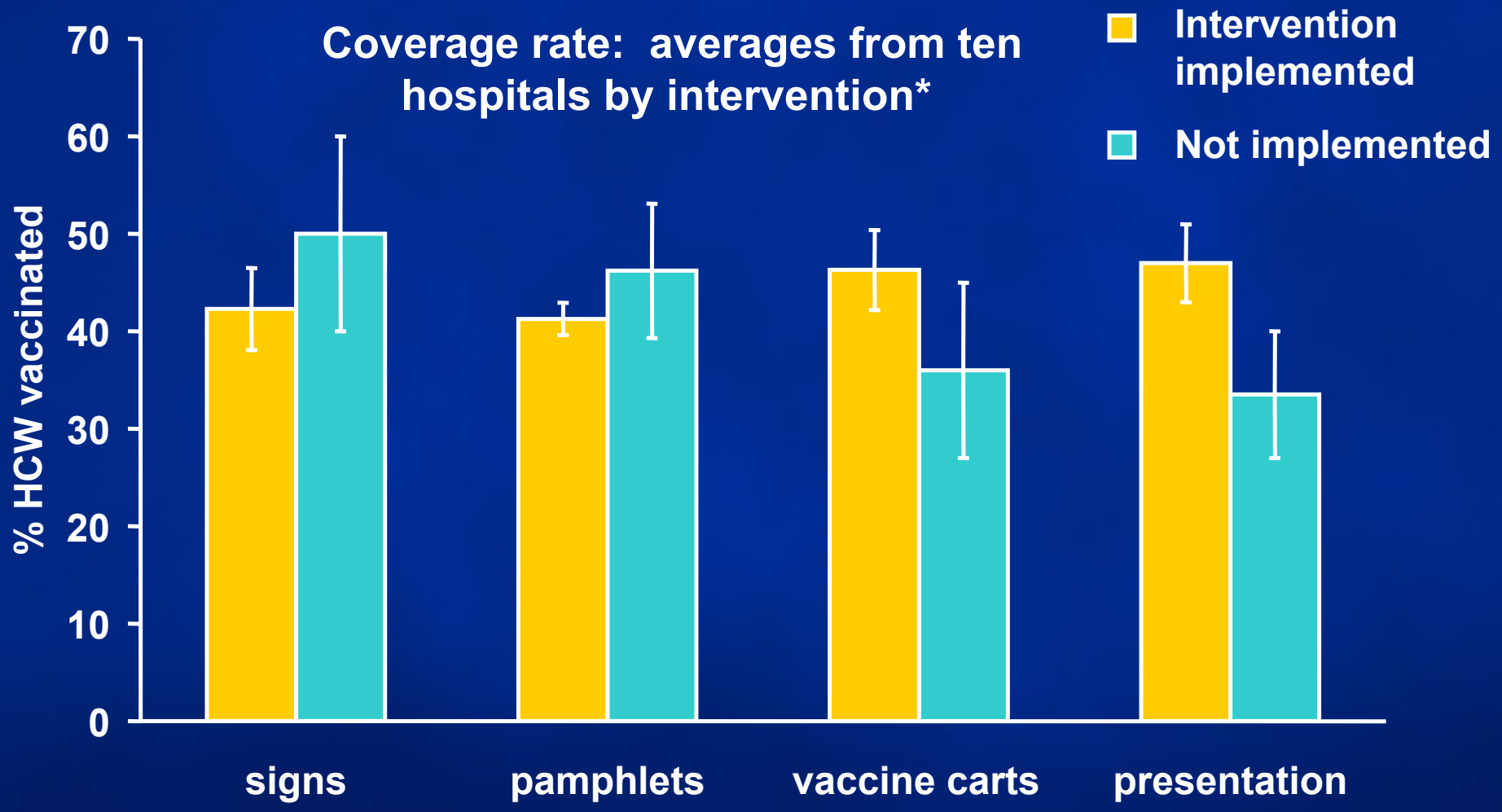
—Alan Janssen: Health Communications

—Margaret Coleman: Economics

—Michael Washington: Industrial Engineering

—Debora Jelks: Immunization Program Management

Increasing Vaccination of Health Care Workers: Potential Interventions



* Based on self reports of Hospital Directors for Infection Control and Employee Health Programs

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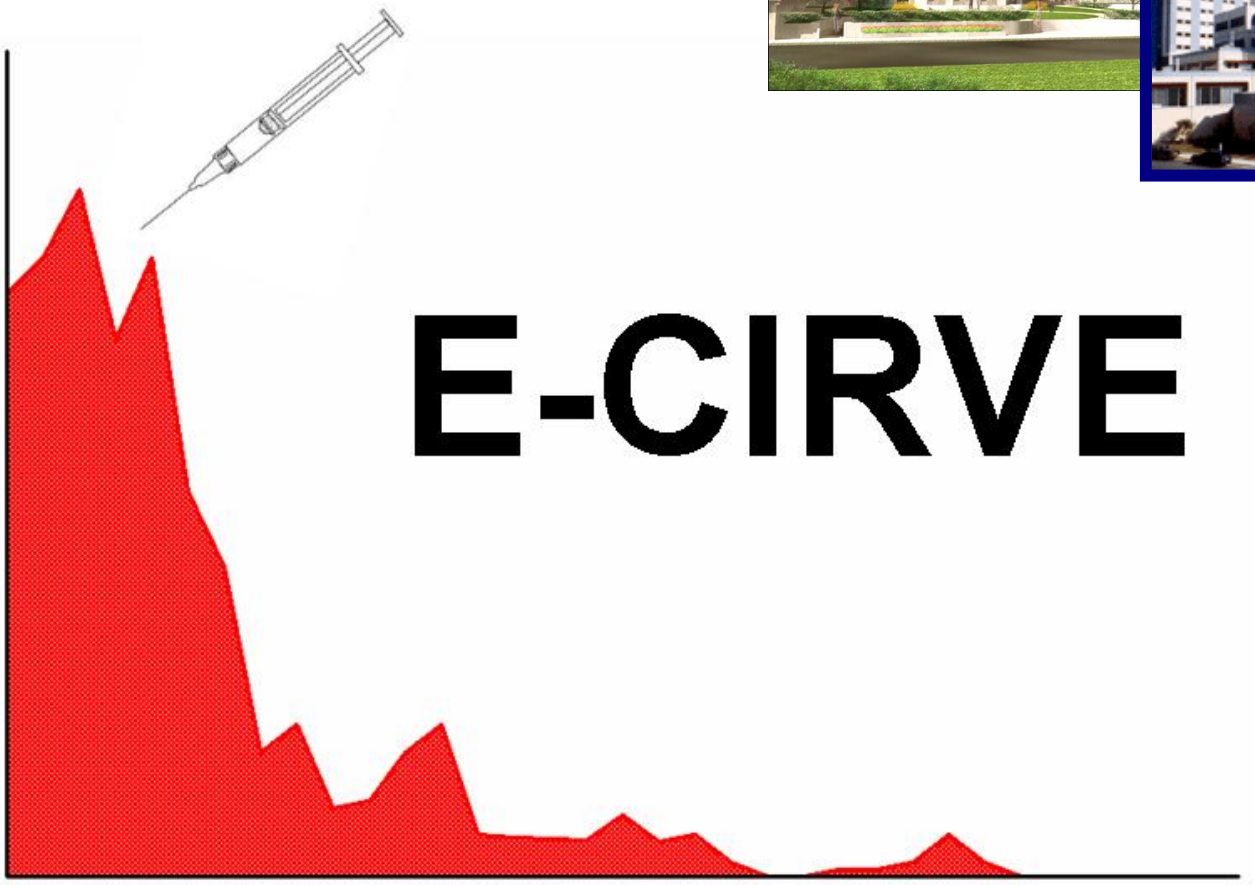

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